

REMARKS/ARGUMENTS

The above-captioned patent application has been carefully reviewed in light of the non-final Office Action to which this Amendment is responsive. Claims 1, 8, 9, 10, 11, 15, 19, 20, 50, 55, 57, 65, 68 and 73 have been amended to more clearly define and particularly point out that which is regarded as the present invention. To that end, it is believed no new matter has been added.

Claims 1-3, 5-40, 44-46, 48, 50-79, 83 and 85 are pending. All of the pending claims have been rejected in light of certain prior art and Claims 15, 16, 19, 20 and 65 have been rejected under certain paragraphs of Section 112 of the Patent Statute. In addition, the disclosure, claims and drawings have been objected to by the Examiner. Applicant respectfully requests reconsideration based on the following amended claims and disclosure as well as the following remarks.

Prior to discussing the prior art in any appreciable detail, Applicant would like first to point out the novel contributions made by the present invention. That is, Applicant has provided a device for viewing an object with a probe, the device, for example, being an endoscope. According to the invention, a single image of an object is split into two images, or image parts which are adjacent, preferably side by side, so that the images can be viewed directly. The two image parts are then focused upon a single imager such that a right image appears on the right hand-side of a connected video display monitor and a corresponding left side image appears on the left hand side of the connected video display monitor.

More specifically, a single image of the object is first split into two separate (first and second) adjacent stereo image parts. The adjacent stereo image parts are then focused onto an image detecting means using a focusing means, wherein the image detecting means is preferably a single electronic imager arranged with respect to the image splitting means and the focusing means along a single optical axis. The image is preferably split by means of a prismatic member into two stereo image parts, the image parts then being focused onto the solid state imager and in such a way that the right hand image focuses on the right hand side of a connected video display monitor and the left hand side upon the left hand side of the video display monitor. As such, the present apparatus and related method includes a single pupil

registered along a single optical axis, as shown for example, in Figs. 1B and 3 of the present application.

The prismatic member of the present invention includes an apex that is convex, thereby causing the images to overlap, the prism being designed therefore is designed such that two separate stereo images are displayed side by side on a single image plan. As such, the prism as designed somewhat corrects the barrel distortion of the wide field of view objective, therefore creating two separate images seemingly having it's own optical center and barrel distortion.

Turning to the cited prior art, Igarashi (U.S. Patent No. 6,471,642B1) relates to an optical system for an endoscope that does include a prismatic element, see Fig. 3. However, this reference specifically requires a two-sided optical lens system for stereoscopic observation, therefore requiring two sets of lenses and at least two electronic imagers. See, for example, col 5, lines 19-24 of the Igarashi patent. The prismatic member, as such, is used with the two-sided lens system, see col 6, line 49 - col 7, line 7. An auxiliary or secondary lens system is also shown, see for example, Fig. 1, but it is very apparent from the teachings of this disclosure that this particular lens system is not used for stereoscopic observation. As such, this primary reference fails to disclose or suggest the creation of separate adjacent right and left handed image parts of an image of an object that are laid onto a single imager and along a single optical axis by means of an image splitting means to permit left and right hand images thereof to be shown side by side, for example, simultaneously, on a video monitor screen.

Sheiman (U.S. Patent No. 4,772,094) relates to a display device that permits right and left handed images to be shown simultaneously to an observer. This system includes a prism window that comprises a pair of prisms to meld left and right images into a single fused image. See Figs. 1-3, for example. Applicants' acknowledge the use of a prismatic member. However, this system fails to produce left and right adjacent stereo image parts that are focused onto an electronic imager according to the present invention.

In fact, Sheiman is believed to be fundamentally different in that the device is used for an entirely different purpose. The image-splitting prism of this reference includes a recessed, possibly concave apex that causes the viewer's left and right

views to diverge after passing through the prism, thereby making the objects in the two separate images appear to be in the same physical location. If one were to look through the prismatic member in the opposite direction, the views still diverge. Therefore, putting this prismatic member in front of an imager could not possibly yield a stereoscopic image using conventional focusing means in that the diverging views would prevent any single point in space on the far side of the prismatic member from being visible in both the right and left images.

The present prismatic member (image splitting means), on the other hand, causes the views to converge such that the right and left hand views always overlap and overlap 100 percent at a predetermined distance.

In addition, the '094 patent fails to disclose incorporation of such a system for use in endoscopic applications and also fails to disclose the use of a single imager and a monitor onto which the left and right hand images would be shown in a side by side arrangement.

Sakiyama et al. (U.S. Patent No. 6,063,023) discloses a measuring system for an endoscope. This system includes a single imager contained within an endoscope tip, but clearly the focusing means requires two focusing or optical axes, see Fig. 5, to focus left hand and right handed images thereupon.

Miyano et al. (U.S. Patent No. 5,840,014) discloses an endoscope that as the Examiner suggest contains a window disposed between certain contained optical imaging elements and an object to be viewed, wherein contact is prevented between external media and the elements. This device, however, does not disclose or suggest the essential features of splitting adjacent first and second stereo image parts and then focusing them onto a single imager for side by side display using a single optical axis in accordance with the present invention.

Hori et al. (U.S. Patent No. 6,191,809 B1) describes apparatus for correcting or aligning first and second image parts. However, this apparatus requires dual objective systems - see Fig. 1 to perform this alignment.

Finally, Ko et al. (U.S. Patent No. 5,710,428) describes an automated feedback system to correct an image that is displayed by a system. This reference, however, fails to remotely disclose or suggest the above stereoscopic specific aspects

concerning the splitting, focusing and displaying of side by side image parts in accordance with the present invention.

Miyano et al (U.S. Patent No. 5,840,014) describes an endoscope. Turning to the prior art rejections in detail, Claims 1, 2, 50, and 51 have been rejected under 35 USC §102(e) as being anticipated by Igarashi. Applicant respectfully traverses this rejection as follows.

First and in order to make an anticipatory rejection under the Statute, each and every claimed limitation must be found in the single cited reference. Those limitations that are not found must be notoriously well known to one of ordinary skill in the field of the invention. The cited reference relates to an optical system for an endoscope, the system permitting stereoscopic observation.

As noted above, the Igarashi reference fails to focus right and left side images on a single electronic imager by using an image splitting means that splits right and left side image parts of a single image and then focuses the image parts onto corresponding portions of the imager along a single optical axis. The cited reference clearly requires two side by side optical systems for stereoscopic observation in which each of the systems direct image parts to a separate imager along a separate optical axis. The provision of the prismatic member 12, (see Fig. 3) does not significantly change this configuration. Independent Claims 1 and 50 have each been amended to more particularly point out that a single optical axis is utilized for the focusing of the adjacent first and second stereo image parts of the object onto the image detecting means which is not defined as an electronic (or solid state) imager. Because this essential feature is neither disclosed or suggested by the cited reference, there can be no anticipation under the Statute with regard to Claim 1, as amended. Claim 2 is believed to be allowable for the same reasons, since this claim is dependent thereupon. Reconsideration is respectfully requested.

As noted, Claim 50 has also been amended to clarify the above feature of the present invention and to particularly note that the image splitting step and the focusing step are each performed along a single optical axis. Because this essential feature is totally absent from the cited reference, there can be no rejection under Section 102. Reconsideration is respectfully requested. Claim 51 is believed allowable for the same reasons since this claim is dependent thereupon.

As to the Section 103 rejections, Claims 3 and 52 have been rejected under Igarashi and Sheiman under 35 USC §103(a). In addition, Claims 6 and 53 have been rejected over Igarashi in view of Sheiman and further in view of Sakiyama, Claims 7 and 54 have been rejected over Igarashi in view of Sheiman and further in view of Miyano et al, Claims 8-13, 15-30,39-40,44-46,48,55-70,75-79,83, and 85 have been rejected over Igarashi in view of Sakiyama, Claims 14, 31-34, 36-38, and 71-74 have been rejected over Igarashi in view of Sakiyama et al. and further in view of Hori et al., and Claim 35 has been rejected over Igarashi in view of Sakiyama et al. and Hori et al. and further in view of Ko. Applicants' respectfully traverses each of the above rejections in that none of the above combinations or any other combinations of the cited art provides all of the claimed limitations of independent Claims 1 and 50, as amended. Therefore, there can be no *prima facie* case of obviousness under the Statute.

More particularly, Igarashi, as previously noted, discloses specifically the requirement of dual objective lens systems and multiple imagers to focus image parts for stereoscopic observation. Igarashi fails totally to describe a system that splits first and second adjacent stereo image parts of an image of an object and focuses those parts along a single optical axis (using a single pupil) onto a single imager wherein side by side (right-hand and left-hand) images of the object can subsequently be displayed of the image simultaneously.

The incorporation of any of the secondary cited references also fails, whether in combination or singly, to describe or suggest the above essentially claimed features of the present invention. Sheiman arguably discloses the formation of left and right handed images using a prismatic member, but each of the images presented for display are entire images and not separate adjacent image parts as required by the present invention of the object being viewed. As such, this reference is still lacking certain essential features now present in each of amended independent Claims 1 and 50. Moreover and as noted above, this reference fails to provide an image splitting means that produces separate adjacent right and left stereo image parts that converge so that when produced on the imager the views will overlap 100 percent at a predetermined distance. Sheiman, as noted above, includes a prismatic member that produces diverging image parts that when focused fails to produce a stereoscopic

image of the object. Each of Miyano and Ko relate only to specific elements that are secondary features of the invention. Neither of these references recite or remotely describe or suggest the above essential features of the invention, as now claimed in Claims 1 and 50. Sakiyama et al. and Hori et al. each involve dual objective lens trains for processing an image. As previously noted, the present system is based upon a single objective pupil and not dual systems as described by Igarashi, Sakiyama and Hori. To that end, a single optical axis is not disclosed for focusing both first and second image parts onto the single image. Because none of these references infer, suggest or otherwise describe the essential features of Claims 1 and 50, as amended, there can be no obviousness under the Statute.

Reconsideration is therefore respectfully requested.

As to the drawing objections noted in the PTO-948, Applicants' herein concurrently submits herewith a Letter to the Official Draftsperson with a set of formal drawings responsive thereto. A courtesy copy is attached for the Examiner's information.

Turning to the Section 112 rejections, Claims 15-16, 19-20 and 65 are rejected under 35 USC §112, second paragraph. In response thereto, Applicants' have amended Claims 15 and 16 to delete the phrase "is effective for" in favor of --is adapted for--. Claims 19, 20 and 65 have each been amended to delete the phrase "consist of" in favor of --comprises--. It is believed each of these amended changes should cure the above noted indefiniteness problems. Withdrawal of this rejection is respectfully requested.

Regarding the claim objections, Claim 53 has been amended to cure the noted antecedent basis problem. In addition and upon review of the application, Claims 8-11, 55, 68 and 73 have also been amended to correct various typographical errata and antecedent basis errors that were previously unnoticed. No new matter has been added. Withdrawal of the objections is respectfully requested.

Applicants' have also amended the specification at page 16 as noted by the Examiner to correct the obvious typographical error regarding the reference numeral for "field calibration". Withdrawal of this objection is also respectfully requested.

Finally, and with regard to the antecedent basis problems concerning the disclosure noted at page 2 of the outstanding Office Action, Applicants' have

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amended the specification at page 10 to include the subject matter of Claims 18, 63 and 64 pursuant to 37 CFR §1.75(d)(1) and MPEP §608.01(o). It is believed these changes do not add any new matter. Reconsideration is respectfully requested.

In summary, it is believed the above-captioned patent application is now in allowable condition and such allowance is earnestly solicited.

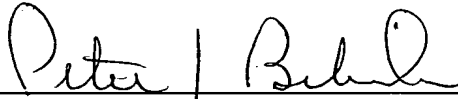
If the Examiner wishes to expedite disposition of the above-captioned patent application, he is invited to contact Applicants' representative at the telephone number below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-0289.

Respectfully submitted,

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